Optimal Technology Adoption when the Arrival Rate of New Technologies Changes

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Abstract

Our paper contributes to the literature of technology adoption. In most of these models it is assumed that after the arrival of a new technology the probability of the next arrival is constant. We extend this approach by assuming that after the last technology jump the probability of a new arrival is not constant.

New technology becomes available according to a Poisson process. The firm can adopt new technology by paying a sunk cost. Deciding about the optimal investment strategy the firm has to take into account that the intensity of the arrival rate can take two values. Right after the arrival of a new technology the intensity equals λ_1 and this level switches to λ_2 if no new technology arrival has taken place in a certain period after the last technology arrival.

In our paper we compare the results of our model to the results of the standard model with constant arrival rate. Furthermore, we investigate the changes in the timing of the firm's technology adoption for different parameter values of the intensity rates.

Particularly interesting is the case where after a new arrival the firm knows for sure that no new technology will arrive for a certain period of time, i.e. $\lambda_1 = 0$. Thinking of electronical innovations it is very natural for a producer that after she recently introduced a new product at the market she will let some time pass for a product update. A consumer who wants to buy a MP3-player knows that after Apple has released a new IPod version, the company will not come up with a new product soon.

In a next step we add uncertainty regarding the moment of the change of the arrival rate. So that the firm does not know when the arrival probability changes.